a seal mounted to the distal end of at least one of the leading or trailing arms, the seal having a face for bearing against one of said belt and said felt; and

at least one of the sensors mounted in the face bearing against one of said belt and said felt.

REMARKS

Claims 1-17 are pending in this application. Claims 1-17 are rejected, and claims 1-17 are objected to in this application. Claims 1, 2, 4-7, 10-12 and 15-17 are amended hereby.

Responsive to the Examiners objections to claims 1-17 at page 2 of the Office Action, Applicants have amended claims 1, 2, 4-7, 10-12 and 15-17 keeping in mind the comments offered by the Examiner. Applicants submit that claims 1-17 are now in allowable form.

Responsive to the rejection of claims 1-11, 16 and 17 under 35 U.S.C. § 103(a) as being obvious by U.S. Patent 6,306,258 (Lange et al.) in view of U.S Patent 5,562,027 (Moore), Applicants have amended claim 1 and 16 and submit that claims 1-11, 16 and 17 are now in condition for allowance.

Lange et al. '258 discloses air press 20 positioned about upper forming fabric 22 and lower forming fabric 24 and web 26 positioned therebetween (column 3, lines 50-52). Air press 20 includes pressure box 28 positioned above upper forming fabric 22 and vacuum box 30 positioned below lower forming fabric 24 (column 3, lines 52-55). Pressure box 28 includes rigidly mounted frame 32 and opensided box 34 mounted to frame 35 (column 4, lines 29-32). The loading of ceramic shoes 53, 54 and the movement of inner box 34 is controlled by pairs of opposed air tubes (column 4, lines 65-67). Upper air tubes 62, 64 move baffles 36, 38 downwardly by expanding between upwardly facing surfaces 66, 68 of short legs 55, 56 (column 4, line 67 through column 5, line 2). Lower air tubes 65, 67 move baffles 36, 38 upwardly away from forming fabrics 22, 24 by expanding between portions 74, 76 of short legs 55, 56 of baffles

36, 38 (column 5, lines 2-6). The upper air tubes 62, 64 and lower air tubes 65, 67 are connected to a source of compressed air (not shown) and a controller (not shown) with which baffles 36, 38 are pressed against upper forming fabric 22 (column 5, lines 7-11). In an alternative embodiment air press 120 employs vacuum roll 124 (column 6, lines 4-13).

Moore '027 discloses system 1 including roll 2 having pressure sensors 4 thereon, lies in a press nip configuration with another roll 6, in Fig. 1 roll 6 is shown as the support roll. Fabric 8 carrying a web 10 of fibrous matter, lies between the two rolls, 2 and 6, causing web 10 to be compressed therebetween. In electrical communication with sensors 4 are associated electronics 24, which aid in converting the sensor output to a pressure value. A roll-mounted multiplexer 12 is accessed by computer 18, to cycle through sensors 4 to obtain output signals indicative of the pressure sensed. Multiplexer 12 is further in electrical communication with bidirectional transmitter 14 which can comprise a telemetry transmitter, slip rings or a rotary transformer. Transmitter 14 transmits the signals from multiplexer 12 to signal conditioner 16 which in turn, delivers conditioned signals representing the pressure sensed, to computer 18. (Column 3, line 66 through column 4, line15). An optional control system 22, can be connected to computer 18 and signal conditioner 16. Control system 22 serves to correct any sensed pressure irregularities by increasing or decreasing the force being applied by the roll. Control system 22 has internal microprocessor 26 for receiving user inputs in response to interpretation of pressure sensed, or for receiving direct pressure readings from the signal conditioner. Microprocessor 26 upon receipt of such signals initiates corrective measures to make adjustments to the journal forces applied between rolls 2 and 6, or to the zone pressures or crown settings when the system is used as part of a controlled crown feedback system. (Column 4, lines 54-65) Sensors 4 can be mounted at roll surface 3, or optionally, sensors 4 can be embedded within roll cover 5 (column 5, line 65 through

column 6, line1). Fig. 3A shows sensors mounted on the roll surface (column 3, line 33). Fig. 3B shows sensors mounted underneath a roll cover (column 3, line 34).

In contrast, claim 1 as amended recites in part, "a support roll and a press apparatus . . . said support roll positioned underneath said paper web . . . a sensor mounted in one of the press apparatus or support roll . . ." (Emphasis added). Applicants submit that such an invention is neither taught, disclosed nor suggested by Lange et. al. '258 and Moore '027 or any of the other cited references, and includes distinct advantages thereover.

Lange et al '258 teaches an air press and a controller. Moore '027 teaches sensors mounted on a roll surface above the web or in a roll cover above the web. However, Lange et al '258 and Moore '027, separately or in combination, fail to disclose, teach or suggest a support roll and a press apparatus, the support roll positioned underneath the paper web and a sensor mounted in one of the press apparatus or support roll. Moore '027 discloses a system including a roll having pressure sensors thereon, the present invention claiming sensors in a roll. Common usage of the word "thereon" is *on or upon* meaning *position in contact and supported by the surface*, whereas "in" denotes *within the confines of or inside* (*The American Heritage Dictionary of the English Language*, College Edition, 1978), therefore Moore '027 does not disclose sensors in a roll, only on a roll. **A term may not be given a meaning repugnant to its usual meaning (MPEP 2173.05(a))**. Further, Moore '027 discloses sensors on a roll positioned above the web as shown in Fig. 1 of Moore '027, not in a support roll positioned underneath the web as claimed by the present invention.

Applicants' invention has an advantage over the cited references in that there is inherently less chance of interrupting the web with sensors in a roll. Another advantage is that a roll cover is not required to use the sensors.

For the foregoing reasons, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of claim 1. Claim 1 and claims 2-11 depending therefrom, are therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and allowance thereof.

In further contrast, claim 16, as amended, recites in part:

> "the support includes a support roll . . . said support roll positioned underneath the paper web . . . the pressure body includes an air pressure chamber having leading and trailing arms disposed to engage one of a belt and a felt to seal the air pressure chamber thereagainst . . . a sensor attached to at least one of the leading or trailing arms at the interface between the at least one arm and one of the felt and belt over the surface of the roll . . .".

(Emphasis added). Applicants submit that such an invention is neither taught, disclosed nor suggested by Lange et. al. '258 and Moore '027 or any of the other cited references, and includes distinct advantages thereover.

Lange et al '258 teaches an air press positioned over a vacuum box or a vacuum roll, and a controller. Moore '027 teaches sensors mounted on a roll surface positioned above the web. However, Lange et. al. '258 and Moore '027, separately or in combination fail to disclose, teach or suggest a support roll positioned underneath the paper web, the pressure body includes an air pressure chamber having leading and trailing arms and a sensor attached to at least one of the leading or trailing arms at the interface between the at least one arm and one of the felt and belt over the surface of the roll. Applicants' respectfully submit that the Examiner has failed to make a *Prima Facie* case of obviousness. Firstly, there is no suggestion or motivation to modify the air press of Lange et. al. '258 with the sensors of Moore '027. Secondly, to mount the sensors of Moore '027 on the ceramic shoes of Lange et. al. '258 would do violence to the air press, sensors, fabric, web, and potentially, to nearby operators and other equipment during operation of the papermaking machine. Finally, Lange et. al. '258 and Moore '027 fail to disclose or teach all of the claim limitations of the present invention.

Applicants' invention has an advantage over the cited references in that it is operationally sound whereas the Examiner's proposed combination and modification is not operationally sound.

For the foregoing reasons, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of claim 16. Claim 16 and claim 17 depending therefrom, are therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and allowance thereof.

Responsive to the rejection of claims 12-15 under 35 U.S.C. § 103(a) as being obvious in view of U.S Patent 5,562,027 (Moore), Applicants have amended claims 12 and 15, and submit that claims 12-15 are now in condition for allowance.

Moore '027 is discussed above.

In contrast, claim 12 as amended recites in part: "a support roll having a cylindrical support roll surface for supporting the paper web . . . said support roll positioned underneath said paper web; a sensor . . . mounted in the support roll surface . . .". (Emphasis added). Applicants submit that such an invention is neither taught, disclosed nor suggested by Moore '027 or any of the other cited references, and includes distinct advantages thereover.

Moore '027 teaches sensors mounted on a roll surface above the web or in a roll cover above the web. However, Moore '027 fails to disclose, teach or suggest a support roll positioned underneath said paper web and a sensor mounted in the support roll surface.

Applicants' invention has an advantage over the cited references in that there is inherently less chance of interrupting the web with sensors in a roll. Another advantage is that a roll cover is not required to use the sensors.

For the foregoing reasons, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of claim 12. Claim 12 and claims 13 and 14

depending therefrom, are therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and allowance thereof.

In further contrast, claim 15 as amended recites in part: "a support roll mounted in opposed array with the controlled deflection roll . . . said support roll positioned underneath said paper web; a plurality of transducers mounted in the support roll surface . . .". (Emphasis added). Applicants submit that such an invention is neither taught, disclosed nor suggested by Moore '027 or any of the other cited references, and includes distinct advantages thereover.

Moore '027 teaches sensors mounted on a roll surface above the web or in a roll cover above the web. However, Moore '027 fails to disclose, teach or suggest a support roll mounted in opposed array with the controlled deflection roll, the support roll positioned underneath said paper web and a plurality of transducers mounted in the support roll surface.

Applicants' invention has an advantage over the cited references in that there is inherently less chance of interrupting the web with sensors in a roll. Another advantage is that a roll cover is not required to use the sensors.

For the foregoing reasons, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of claim 15. Claim 15 is therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and the allowance thereof.

For the foregoing reasons, Applicants submit that the pending claims are definite and do particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Moreover, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of the amended claims. The pending claims are therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and allowance of the claims.

In the event Applicants have overlooked the need for an extension of time, an additional extension of time, payment of fee, or additional payment of fee, Applicants hereby conditionally petition therefor and authorizes that any charges be made to Deposit Account No. 20-0095, TAYLOR & AUST, P.C.

Should any question concerning any of the foregoing arise, the Examiner is invited to telephone the undersigned at (260) 897-3400.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231, on: December 23, 2002.

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December 23, 2002
Date

Title: CONTROL SYSTEM FOR GAP MEASURING
Application Serial No.: 09/713,434 Group: 2859 Examiner: M. Jagan

ATTACHMENT A:
MARKED-UP COPY SHOWING AMENDMENTS

IN THE CLAIMS

1. (Twice Amended) A control system for measuring a gap in an apparatus for pressing a traveling paper web, comprising:

a support roll and a press apparatus, said press apparatus including a pressure body, said pressure body and said support roll defining the gap therebetween, said support roll positioned underneath said paper web;

a frame movably supporting the [press apparatus] pressure body;

an actuator operatively disposed between the frame and [press apparatus] pressure body for selectively moving the [press apparatus] pressure body toward and away from the support to control the gap size;

a sensor mounted in one of the press apparatus or support roll for producing a signal indicative of the pressure on the paper web as the paper web is passed through the gap adjacent said sensor; and

a controller operatively linked with the sensor for receiving the signal, determining the measure of the gap as a function of the pressure, and causing the actuator to move the [press apparatus] pressure body to control the gap size.

2. (Amended) A control system for measuring a gap as set forth in claim 1, [wherein the] further including a belt [is] interposed between the paper web and the press apparatus; and the press apparatus includes an air chamber for applying pressurized air to the belt.

4. (Twice Amended) A control system for measuring a gap as set forth in claim 3, wherein the [press apparatus] pressure body includes leading and trailing arms; a seal is mounted on a distal end of at least one of the leading or trailing arms for contacting one of a belt and a felt in nipping engagement therewith; and [a] the transducer is mounted in the seal of at least one of the leading or trailing arms for producing signals indicative of the gap between the press apparatus and the support.

5. (Twice Amended) A control system for measuring a gap as set forth in claim 1, wherein the support comprises a rotatable support roll having a cylindrical support surface; and the [press apparatus] pressure body includes a seal which has an outer surface contoured to substantially conform with the support surface of the support roll.

6. (Amended) A control system for measuring a gap as set forth in claim 1, wherein the actuator comprises at least one flexible tube capable of expanding or contracting upon being linked with a source of pressurized air to selectively apply force to move the [press apparatus] pressure body to control the gap size.

7. (Twice Amended) A control system for measuring a gap as set forth in claim 6, wherein the [press apparatus] pressure body includes a seal for contacting one of a belt and a felt in nipping engagement therewith.

10. (Twice Amended) A control system for measuring a gap as set forth in claim 1, wherein the paper web is disposed to travel between a belt and a felt; the support comprises a support roll having a roll surface; the [press apparatus] pressure body includes a seal having a surface curved for engaging the belt over the support roll surface; and the sensor includes a transducer operatively mounted in the seal curved surface for engaging the belt and producing a

signal indicative of the gap between the seal surface and the support roll surface as the belt, paper web and felt are passed therebetween.

11. (Amended) A control system for measuring a gap as set forth in claim 10, [wherein the] further including a pressure transducer [is] coupled with a controller, which in turn is coupled with a source of pressurized air whereby the controller controls said source of pressurized air to provide a predetermined air pressure as a function of the pressure transducer signal to produce a corresponding force in the pressing apparatus and seal to maintain the gap at a predetermined size as measured by the pressure transducer.

12. (Twice Amended) A control system for measuring a gap in an apparatus for pressing a traveling paper web, comprising:

a controlled deflection roll having a center shaft and a hollow cylindrical roll shell rotatably disposed about the support shaft and at least one pressure shoe mounted on the center shaft for supporting and applying pressure to the roll shell against the inner cylindrical surface thereof;

a support includes a support roll having a cylindrical support roll surface for supporting the paper web, said support roll and said controlled deflection roll defining the gap therebetween, said support roll positioned underneath said paper web;

a sensor includes at least one transducer producing a signal and mounted in the support roll surface; and

a controller operatively linked with the sensor for receiving the signal, determining the measure of the gap as a function of the pressure, and causing an actuator to move the controlled deflection roll to control the gap size.

15. (Twice Amended) A control system for measuring a gap and apparatus for pressing a paper web as the paper web travels through the gap, the apparatus comprising:

a controller;

a pressure source;

a controlled deflection roll having a center shaft and a hollow cylindrical roll shell disposed for rotation about the center shaft, the controlled deflection roll further having a plurality of end-aligned shoes mounted on the center shaft for supporting and applying pressure to the roll shell against the inner cylindrical surface thereof;

a support roll mounted in opposed array with the controlled deflection roll such that the gap is formed between the controlled deflection and support rolls as the [composite] paper web is passed in the nip therebetween, said support roll positioned underneath said paper web;

a plurality of transducers mounted in the support roll surface for measuring the gap beneath each transducer, each of the transducers linked to the controller to provide signals indicative of the gap adjacent a specific transducer;

the pressure source is operatively linked to individual shoes for providing power to move the shoes relative to the center shaft;

the controller is operatively linked with the pressure source to actuate individual shoes responsive to signals received from corresponding transducers indicative of gap measurement at a corresponding location along the nip between the controlled deflection roll and support roll.

16. (Twice Amended) A control system for measuring a gap in an apparatus for pressing a traveling paper web as the paper web travels through the gap, the apparatus including a support and a press apparatus, said press apparatus including a pressure body, said pressure body and said support defining the gap therebetween, comprising:

a frame for movably supporting the [press apparatus] pressure body;

the support includes a support roll having a cylindrical surface, said support roll positioned underneath the paper web;

the [press apparatus] pressure body includes an air pressure chamber having leading and trailing arms disposed to engage one of a belt [or] and a felt to seal the air pressure chamber thereagainst;

a pressure source for providing pressurized air to the air pressure chamber for providing pressing force to the web as the web passes beneath the air pressure chamber over the support roll surface;

[a] at least one sensor attached to at least one of the leading or trailing arms at the interface between the at least one arm and one of the felt [or] and belt over the surface of the roll for producing a signal indicative of the pressure on the paper web as the paper web is passed proximate to said sensor; and

a controller operatively linked with said pressure source and with the at least one sensor for receiving the signal, measuring the gap and selectively causing increasing or decreasing pressure on the [press apparatus] pressure body to control the gap.

17. (Twice Amended) A control system for measuring a gap as set forth in claim 16, further including:

a seal mounted to the distal end of at least one of the leading or trailing arms, the seal having a face for bearing against one of said belt and said felt; and

at least one of the [transducers] sensors mounted in the face bearing against one of said belt and said felt.